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# THE HISTORY OF THE TUBERCULOSIS WORK AT SARANAC LAKE, NEW YORK.

BY

EDWARD L. TRUDEAU, M.D.

[Delivered under the auspices of the Henry Phipps Institute for the Study, Treatment and  
Prevention of Tuberculosis, Philadelphia, October 22, 1903.]

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# THE HISTORY OF THE TUBERCULOSIS WORK AT SARANAC LAKE, NEW YORK.\*

By EDWARD L. TRUDEAU, M.D.

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THIRTY years ago, when I went into the Adirondack wilderness to try to prolong my life, nothing would have seemed more improbable than that I should have lived to avail myself of the great honor of addressing you on such an occasion as this, or that anything which could occur in a life spent in those remote and primitive surroundings might be considered by the management of the Phipps Institute at all worthy of your attention to-night. I have to offer for your consideration only a brief retrospect of the advance which has been made in our knowledge and treatment of tuberculosis, and of the manner in which this knowledge has been practically applied in meeting the tuberculosis problem as developed, year by year, at Saranac Lake.

In 1873 the medical profession took little interest in the disease known as consumption, and the general public knew little about it except, perhaps, that it was thought to be always inherited and was considered almost invariably fatal. The immediate cause of the disease was unknown, and there was no recognized treatment for it except change of climate, and patients were sent principally to warm climates in a desultory sort of way because they coughed, and nothing that could be done for them at home was of any avail.

Each medical authority held differing and often very decided views as to the relative advantages of various climates; some finding the essential qualities of good climate for the consumptive to be warmth and equability, others laying special stress on dryness or elevation. Nevertheless, little by little it became evident that the great majority of consumptives died wherever they were sent, and the few recoveries which took place occurred in regions which differed entirely as to elevation, temperature, and dryness, and that as many patients recovered in the intense cold and storms of the high Alps and other mountains as in the warm, equable temperature and dryness of atmosphere to be found in such countries as Egypt and the south of France, while cures were reported from time to time in patients who had gone on long sea voyages or remained in indifferent climates where none of the conditions considered essential existed.

Wherever the consumptive was sent by his physician, little or no stress was laid upon regulating the habits of his daily life, beyond a recommendation to live out of doors and to exercise as much

as possible, while for medication cod-liver oil and, later, creosote, were generally prescribed. There was little special hospital accommodation for the consumptive. Most hospitals admitted a few cases of tuberculosis to their general wards when they had empty beds, and the larger institutions, like Bellevue and Blackwell's Island in New York, had special wards devoted to consumptives. There were also a few homes for consumptives in existence, but no institution was presumptuous enough to announce that its object in taking these patients was anything beyond affording them a place where they might die. In the consumption hospitals in existence the administration of anodyne cough mixtures, and the keeping of the wards at a given temperature, were the only attempts at treatment, and in order to meet the latter condition and prevent the patients from taking cold the windows were generally kept tightly closed. This condition of affairs has come within my own personal observation in a hospital near Philadelphia.

The climatic treatment was within the reach of only a very small class of patients; namely, the well-to-do; and they were not generally sent away until their physicians or they themselves became alarmed at the activity of their symptoms. The poor, and the large class of men and women who depend upon their daily work for their support, were left to their fate. No special stress was laid on the early recognition of the disease, as it was generally believed to be fatal. This, then, was approximately the attitude of the profession and the public toward tuberculosis when I went to the Adirondacks in 1873.

This region was at the time a real wilderness, visited during the summer months only by a few sportsmen, and it was then that I met Dr. Alfred Loomis, who, in spite of my critical condition, encouraged me in my determination to remain at Paul Smith's during the winter. My good wife cheerfully acquiesced in the plan, in spite of the gloomy prognostications of many medical friends who tried to dissuade me from so rash a step, and it was entirely due to her encouragement and determination that we settled down in 1874 at Paul Smith's, then a small summer hunting lodge, to face the severity of an Adirondack winter, 42 miles from a railroad or a physician, and completely cut off for weeks at a time by the deep snows from any communication with the outer world. The spring found me much improved, and it was owing to the good results in my case, as well as in several other patients whom he sent subsequently to winter in the Adirondacks, that Dr. Loomis published a paper in the *Medical*

\* Dr. Trudeau's lecture is the first of a series to be given by the Henry Phipps Institute during the coming winter in the crusade against Tuberculosis. These lectures will be six in number, three of which are to be given by Americans, Doctors Trudeau, Osler and Biggs, and three by Europeans. Those who have accepted from Europe are Dr. Pannwitz, of Germany, and Dr. Maragliano, of Italy.

Record in 1876, drawing attention for the first time to the climatic value of this region for pulmonary invalids. The following winter, and indeed the next 29 winters, have been spent in Saranac Lake, which was then situated 42 miles from the nearest railroad, and consisted of a saw-mill and half a dozen guides' houses, but which has now grown to be a town of four thousand inhabitants, and is known both here and abroad as a health resort.

Long before this time, as early as 1859, Dr. Brehmer, in Silesia, began to work out the prin-

how he lives that is of the most importance, and that the pulmonary invalid cannot be left safely to his own devices as to his mode of life in any climate. A life spent entirely out of doors, in any kind of weather, good and abundant food and rest and discipline, are the all-important factors to utilize in bringing about a cure.

He demonstrated by the excellent results he obtained that the careful regulation of the patient's daily life (so far as air, food, rest, and exercise are concerned), is necessary, if the best results are to be looked for, and that if this is done for



The first cottage, Adirondack Cottage Sanitarium, built in 1884.

ciples on which the Sanitarium treatment of tuberculosis is based, and published several articles on this subject, which, however, attracted but little attention for a long time in Europe, and remained unnoticed in this country, but which have been the foundation upon which the Sanitarium treatment of this disease, now so generally recognized all over the world, has been based.

Brehmer insisted that climate is not the only and all-important factor in treating the disease, and that the consumptive is never injured by exposure to inclement weather, provided he is accustomed to live constantly out of doors; that it is not so much *where* the consumptive lives as

many months a cure may confidently be expected in a fair proportion of cases. Nowhere can this plan be followed thoroughly except in a Sanitarium built for this purpose, and where the patients live with the physician and are constantly under his eye.

It is interesting to note that this great advance in the treatment of pulmonary tuberculosis took place before Koch's epoch-making discovery of the tubercle bacillus, and has been in no way influenced and modified by it. I was greatly impressed with Brehmer's views, and anxious to test his method, the more so as the urgent need of supplying at Saranac Lake a place where per-

sons of moderate means could be properly cared for soon became apparent. Thus, little by little, the idea of starting a sanitarium for working men and women, at a cost to them less than the expense of operating it, began to crystalize in my mind. Dr. Alfred Loomis, whom I saw during the summer at Paul Smith's promised the support of his great name, and offered, should I succeed in establishing such an institution, to examine applicants in New York free of charge, a service which he rendered the institution until his death. The first subscription was given me by Mr. and Mrs. Anson Phelps Stokes, whose ever-helpful in-

ered piazza, where, after much persistence and eloquence, I persuaded my first two patients to sit most of the day at rest. This was, as far as I know, the first attempt in America at applying the sanitarium rest and open-air method according to Brehmer's and Dettweiler's teachings, and from this humble beginning the institution gradually and steadily developed until it has become a small village, and the principles of treatment upon which it was founded have gained general acceptance over the entire land. The evolution of the cottage has continued, and the latest cottages are substantial yellow brick and stone structures.



The Adirondack Cottage Sanitarium in 1886. View showing all the buildings then on the grounds.

terest, as well as that of many of my personal friends, has never failed me through all these years. Thanks to the generous response of these friends, I soon had collected a fund of about \$5,000, and having bought, with money donated by guides and residents of Saranac Lake Village, a few acres of land on a sheltered hillside where I had often stood while on my hunting trips, and which seemed eminently suitable for the purpose, I began, in 1884, the erection of two small buildings. Since segregation of patients was the aim held in view, the cottage plan was adopted.

The first cottage consisted of one room, heated by a wood stove and lighted by a kerosene lamp. It accommodated two patients, and cost about \$350. It was furnished with a small cov-

costing about \$5,000, and accommodating four patients. They are models of convenience and comfort, and are eminently adapted to carrying out the open-air treatment. They are lighted by electricity, heated by hot water and fireplaces, supplied with baths and running water, and each room opens directly on a covered veranda, upon which the patients' beds are easily pushed when ordered temporarily to remain in bed, as well as to sleep out at night.

Each year as obstacles presented themselves they were overcome, and as needs developed they were supplied. As time passed, the struggling institution needed, in turn, more land, an abundant water supply, good drainage, electric lighting, a crematory for the disposal of infectious material,

an open-air recreation pavilion, many more cottages, a library, a chapel where religious services could be held, and an infirmary where the very sick could be properly nursed, and as the cottages increased in number, a new administration building suited to the enlarged needs of the growing community. As these needs arose, from year to year, they were supplied, thanks to the never-failing generosity of the Sanitarium's friends, until to-day, a small village consisting of twenty-two buildings entirely free from any financial encumbrance, has grown up about the little one-room cottage which still stands as a reminder of the institution's humble beginning.

New problems had constantly to be solved. One of these was the nursing of the acutely ill cases. Though patients when admitted were in such condition as to require nothing more than general supervision, sooner or later after admission some of the complications of the disease,

later, the Childs Memorial, put at our disposal buildings where patients could be transferred at once when acutely ill, and furnished every convenience and appliance for carrying out the most approved methods for their nursing and treatment until sufficiently recovered to be returned to their cottages.

The requisites for admission to the Sanitarium have always been that the applicant should be in the earlier stages of the disease, or with a fair chance of more or less complete restoration to health, and that his pecuniary circumstances should be such as to make it impossible for him to pay the usual prices asked at the hotels and boarding houses of the region. The price charged from the first has been five dollars a week, and has remained the same for the past twenty years, in spite of the greatly increased cost of operating the institution due to improved methods and the higher cost of living. Each pa-



Adirondack Cottage Sanitarium in 1900. View looking west, showing less than one-half the buildings on the grounds.

such as hemorrhage, pleurisy, and the tuberculous pneumonias and exacerbations so frequent in this disease, would transform a promising patient, entirely able to care for himself, into a bed-ridden invalid, who needed for weeks or months, both day and night, constant nursing and attention.

During the earliest years of the Sanitarium's existence, when it was still 42 miles from a railroad, no nurses were available, and I had no money to procure them. I had no resident physician and nothing to offer as a salary to one, so that during the summer I had to do the medical work of the institution as best I could, being obliged to drive from Paul Smith's, fourteen miles each way, in order to accomplish this. But the problems were finally solved. A physician was found in ill health himself, who was induced to take up his abode at the Sanitarium, giving what service he could in return for his board and lodging; and the gift of the Hall Memorial, and

tient costs the institution from eight to nine dollars a week, so that there is a deficiency of about four dollars a week on every patient. There are no private patients and no graded rates, every one being on the same basis. No charge is made for medical attendance, and no extra charges except when the patients are so ill as to be confined to bed and taken to the infirmary, thus requiring constantly the services of a nurse, special diet, etc., when the additional regular infirmary charge of five dollars a week is made.

The Sanitarium has also a small Free Bed Fund, the income of which is applied to defray the expenses of patients whose resources have entirely given out.

It took a long time to overcome the prejudice existing in the professional as well as the lay mind against hospitals for consumptives, a prejudice founded at first on the discouraging death rate among patients in such institutions, and, later on, the fear of infection. The excellent results

obtained at the Sanitarium soon overcame the first objection. Dr. Hance's research, which proved that the dust taken from all the buildings at the institution, except in one instance, failed to infect guinea-pigs, and the published fact that ever since the Sanitarium was opened none of our employees or servants has been known to develop consumption, soon proved that the measures adopted to guard against infection there were efficacious for the protection of all residing at the institution. During the first years of the Sanitarium's existence I had much difficulty in filling its few beds, and, on many occasions, it took all my eloquence and persuasive powers to prevent the few patients from deserting on short

can be used only in the relative sense, as we know that relapse is the rule rather than the exception in this disease.

In my report for 1902 we find that of the really incipient cases, which were only 40 in number, 75 per cent. were discharged as apparently cured, 15 per cent. had their disease arrested, and 10 per cent. improved; while of the advanced cases, 99 in number, 12 per cent. were discharged as apparently cured, 57 per cent. with disease arrested, 22 per cent. improved, 8 per cent. failed, and 1 per cent. died in the institution; of the far advanced cases, none was apparently cured, in 33½ per cent. the disease was arrested, 33½ per cent. improved, and 33½ per cent. failed while



Abby Sage Richardson Memorial Cottage, Adirondack Cottage Sanitarium, 1902.

notice. The education of the public as to the value of sanitarium treatment little by little became apparent, and of late years there has always been a long waiting list. Not one in twenty who apply can be taken, and many institutions like the Sanitarium would be required to accommodate those who constantly knock at its doors.

The exact results obtained by the combined climatic and sanitarium treatment are difficult to express in figures, because these results are greatly influenced by the class of cases accepted for treatment, and the classification of these cases is purely arbitrary. Many cases, no doubt, would be classed by one physician as incipient and by another as advanced, according to the views held by each as to the disease, and the personal bent of the individual. In addition, the word *cured*

under treatment. Thus, for the 165 cases at whatever stage treated during that year, we find that 30 per cent. were discharged as apparently cured, in 41 per cent. the disease was arrested, 19 per cent. improved, 7 per cent. failed, in 2 per cent. the diagnosis was doubtful, and 1 per cent. died in the institution.

To all who are familiar with the relapsing nature of tuberculosis, an inquiry bearing on the permanence of the results obtained, promised most discouraging revelations. Thanks to a most exhaustive and yet unpublished inquiry by Dr. Lawrason Brown, the Resident Physician, as to the permanency of the results obtained by this method of treatment, I am able to present to you to-night accurate information on this all-important subject. From Dr. Brown's exhaustive

study and careful figures, I will quote only briefly:

Of the 1,500 cases under consideration, which have been discharged from two to seventeen years, 434 could not be traced, leaving 1,066 which have been traced. Of these, 46.7 are still living. Of these, 31 per cent. are known to be well at present, in 6.5 per cent. the disease is still arrested, 4 per cent. have relapsed, 5.2 per cent. are chronic invalids, and 53.3 per cent. are dead. As to the influence of the stage of the disease on the permanency of the results obtained, he found 66 per cent. of the 258 incipient cases discharged are well at present. Of the 563 advanced cases 28.6 per cent. are well, and of the far advanced cases 2.5 per cent. only, remain cured.

Thus we learn that 31 per cent. of all cases discharged from two to seventeen years ago have remained well, that 66 per cent. of the incipient cases discharged during the same time continue well at present, and these figures, discouraging as they may seem to those of you who are not familiar with this fatal malady, emphasize the importance of making an early diagnosis, and teach us exactly to what extent we may count on saving and prolonging life by this method of treatment.

The only specific treatment which has been carried on at the Sanitarium has been Koch's tuberculin treatment. It has been used in a limited number of cases ever since Koch first proposed it, in order that some evidence might be obtained as to its specific influence when given under the most favorable conditions of environment and where patients were constantly under medical supervision. Its use has been found inadmissible in the active types of the disease, and has been confined almost entirely to incipient cases and advanced cases of subacute types only. Of the patients selected for tuberculin treatment 29 per cent. were classed as incipient, 63 per cent. as advanced, and 8 per cent. as far advanced.

All the tuberculins prepared by Koch, as well as Hunter's modification, most of which were made in the Saranac Laboratory, have been tested. At present Koch's emulsion of crushed bacilli is being employed in a few cases. I lay before you now the results of my experience with this method, so far as this can be shown briefly by figures. These patients have been discharged for a sufficient length of time to give an idea of the permanency of whatever favorable results have been obtained.

From 1890 to 1901, 143 cases were treated by this method, and of these 58 per cent. are alive, 33 per cent. are dead, and 9 per cent. are untraced. If we now take the 1,367 cases treated at the Sanitarium without tuberculin during the same period of time, we find that 38.9 per cent. are alive, 39.6 are dead, and 21.4 per cent. are untraced. This leaves a considerable percentage of living, 20 per cent. in favor of the tuberculin treated cases, but it would perhaps be a just criticism to say that the value of any deduction based on these figures is impaired by the fact that the tuberculin cases were to a certain extent selected, and for

this reason were possibly of a somewhat more favorable type than the general average of the total number treated at the institution during the same period of time which served for comparison. I have therefore procured from Dr. Brown the results in the incipient cases only, treated with and without tuberculin, which were discharged during the same period of time, 1890 to 1901. Of the incipient cases which received no tuberculin 61 per cent. are alive up to date, while of the tuberculin treated incipient cases, 76.7 per cent. are living to-day. Thus it would seem that there is still an appreciable though not very pronounced percentage in favor of the tuberculin treated cases.

But the lives that the Sanitarium has saved and prolonged have not been all that it has accomplished. The hundreds of patients discharged during the past twenty years have been so many missionaries who have scattered over the land, imparting to others the simple but all-important knowledge as to protective measures and hygienic mode of life which they have been so practically taught in the institution. And, besides all this, by affording a scientific demonstration that a fair proportion of tuberculous patients can be cured and restored to lives of usefulness, the Sanitarium has had an influence in bringing about a new attitude of hopefulness towards the disease which has inspired the building of similar institutions.

A cooperative scheme for obtaining employment for patients discharged from the Sanitarium is now on foot, and will soon be tried practically. For this scheme I bespeak your interest, as I feel more patients could be permanently restored if they could procure suitable employment after leaving the Sanitarium.

The responsibility of procuring enough money each year for the support and development of the work has fallen throughout mainly upon me, and the bulk of the burden has been transferred by me to my personal friends, who have never failed to respond to my appeals during these many long years. At first I experienced the greatest difficulty in getting together the comparatively small sums needed, because people then looked upon any attempt to cure tuberculosis with the utmost incredulity, and evidently considered me a well-meaning but impractical enthusiast. The Sanitarium has been throughout essentially an Adirondack charity; that is, it has owed its support almost entirely to visitors who come to the St. Regis and Saranac Lake region, in search of pleasure, recreation, or health. The two fairs held each year at Paul Smith's and the Saranac Inn have supplied a goodly share of the funds necessary to meet the yearly deficit in running expenses. I will not weary you with the financial details of the work. Suffice it to say, that, starting with no other capital but its good cause and its friends, the Sanitarium now represents a plant worth about \$350,000 which is paid for; a yearly deficit on running expenses of \$7,000 to \$20,000 has been met for twenty years entirely by subscriptions, and an Endowment Fund of \$200,-

000 has been little by little put aside, the interest of which has been allowed to accumulate each year, as \$400,000 will be needed before the deficit in the running expenses can be even approximately supplied by this fund, and the work established on a permanent financial basis.

The Sanitarium has not paid for all the services rendered there. It never could have accomplished what it has, and its very existence in the earlier years would have been impossible but for the self-sacrificing devotion of its officers and even its employees. The late Dr. Alfred Loomis, and the Examining Physicians in New York, Boston, Philadelphia, Baltimore, and Saranac Lake, have always given their services to the institution without charge. The Trustees, and Mr. D. W. Riddle, the Treasurer, have done the same. The Late Frank Ingersoll, the resident officers, Mrs. Julia Miller, Miss Marguerite DeLong, Miss Collins, and the resident physicians and nurses have given through all these years, of their time, their strength, and even the work of their hands, and received inadequate compensation, and often no remuneration at all. Though the Sanitarium has never had money enough to pay for the services required to do its work, the institution has received throughout all these years the kind of devoted service which no money can command, and which has made its work a benediction to those it has sought to relieve.

In 1882, Robert Koch announced to the world his discovery of the tubercle bacillus. His paper on the Etiology of Tuberculosis (probably the most far-reaching in its importance to the welfare of the human race of any original communication), based on experimental research, at once threw a flood of light on the darkest page in the history of medicine, a light which revealed the microscopic fungus which is the direct cause of tuberculosis, gave a new impulse, and opened a new horizon to medical thought.

As Brehmer's and Dettweiler's writings had furnished me with the incentive to establish the Sanitarium, Koch's paper, an English translation of which was sent me by my friend, Mr. C. M. Lea, was my inspiration to scientific research. In bringing to your notice my first efforts to do scientific work, I quote briefly from a paper read before the Laennec Society of the Johns Hopkins Hospital.\*

"I had from the first many difficulties to contend with; no scientific training, no apparatus, no access to books, and the remoteness of my surroundings removed me from contact with medical men to whom I might apply for instruction and help.

"In some of the short visits I was enabled to make to New York, Dr. Prudden taught me how to stain the bacillus, and the first principles of bacteriology, and I taught myself the rest as best I could. My laboratory was a very small room in my house, in which, during the intense cold of winter, water generally froze at night in spite of my best efforts, as we had no coal in Saranac

Lake in those days, and the wood stove could not be counted upon to burn all night. I had no apparatus but my microscope. With Dr. Koch's paper as a guide, I succeeded, however, in growing the tubercle bacillus in a homemade thermostat, which had no regulating apparatus, and which was heated by a small kerosene lamp only. In order to protect this from the violent changes of temperature, which occurred principally at night, I had enclosed it in a series of wooden boxes, the doors of which could be opened or closed at will, according to the intensity of the cold out of doors. But on very cold nights I was obliged to get up in the night to make a fire in the stove in order to prevent too violent changes of temperature in my little oven.

"With these primitive arrangements, after many failures, I obtained the tubercle bacillus in pure cultures, being, I believe, the second observer in America to do this. With these cultures I repeated all of Koch's inoculation experiments. My guinea-pigs had to be kept in a hole under ground, heated by a kerosene lamp, this being the only spot in Saranac Lake where they could escape freezing at night.

"In 1886, I studied the influence of extremes of environment in the course of inoculation tuberculosis. Many of my inoculated rabbits allowed to run wild on an island recovered or developed only localized disease, while those placed under the most unhygienic conditions I could devise died of tuberculosis in a few months. The results of this research increased my confidence in the influence of a favorable environment on the course of the disease, and confirmed my faith in the value of the sanitarium and open-air method of treating tuberculosis, of which I was then making a practical application in the establishment of the Adirondack Sanitarium.

"During the same week in which Koch's announcement of the discovery of tuberculin and of his hopes as to its specific curative action on tuberculosis, was flashed across the ocean and created in medical circles an excitement which has never been equaled, I published in the *Medical Record* an article describing my attempts at the production of artificial immunity in animals by the injections of sterilized and filtered liquid cultures of the tubercle bacillus (tuberculin), and my failure to obtain any appreciable degree of immunity by this method.

"About this time, while ill in New York, my house burned to the ground, the fire having originated during the night from the explosion of the kerosene lamp of the thermostat in my little laboratory, and everything in the house and laboratory proved a total loss. Two days after the fire I received from Dr. Osler a brief note, which shows that his great reputation should not be limited to his attainments as a physician, but that he may lay claim also to some reputation as a prophet. The entire substance of the note was as follows:

"DEAR TRUDEAU.—I am sorry to hear of your misfortune, but, take my word for it, there is nothing like a fire to make a man do the Phoenix trick."

"Dr. Osler's prophecy very soon began to be realized. A friend and patient of mine, Mr. George C. Cooper, called on me the day after the fire, and after expressing his sympathy, told me that as soon as I was well enough he hoped I would return to Saranac Lake and build a suitable laboratory, one that could not burn down; that he wanted me to build the best I could plan for the purpose, and that he would pay for it.

"The building is of cut stone, slate, glazed brick, and steel, completely fireproof, lighted by electricity, heated by hot water, supplied with its own gas machine for the thermostats, Bunsen burners and sterilizers, and furnished with every

been devoted to testing experimentally proposed specific methods of treatment and consumption cures, and the fallacies of all methods which aim at the destruction of the tubercle bacillus in the living tissues by germicidal agents was soon demonstrated. The next phase of our work was that which was devoted to attempts at the production of immunity by injections of sterilized cultures and the toxines of the tubercle bacillus, and to the manufacture and testing on animals of all these products, whether proposed by others or of our own manufacture.

We gradually reached the conclusion that a certain degree of toxin immunity could be pro-



Exterior of Laboratory.

appliance for bacteriological and chemical work. It has a library which was donated by the late Horatio Garrett, of Baltimore, while the continuance of the experimental work so far has been made possible through the generosity of the late Mr. George Cooper, the late Miss Cooper, Mr. John Garrett, Mrs. A. A. Anderson, and others, who from time to time have given sums of money to defray the necessary expenses." The expenses of the work during the past year were entirely defrayed by Mrs. A. A. Anderson.

Time will allow me only to touch on a few points relating to the work of the Laboratory. A good deal of the work of the Laboratory has

duced, but that this of itself did not protect animals against inoculation with living virulent bacilli. The tuberculin test and the mechanism of the tuberculin reaction have formed the subject of many of our studies which have tended to demonstrate the reliability of the tuberculin test and its apparent freedom from dangerous after-effects. The chemistry of the tubercle bacillus has also been the subject of many researches by my associates, and the results have been published from time to time.

Most of my own work has been devoted to the study of methods which might tend to produce artificial immunity. I learned by practical ex-

perience that toxine immunity and bacterial immunity in tuberculosis do not go hand in hand. While I could accustom my animals by gradually increased doses at intervals to bear with impunity amounts of tuberculin and other toxic products of the tubercle bacillus which at first would have proved fatal, I found that this toxine immunization did not protect the animal against the invasion of his tissues by living virulent bacilli when subsequently inoculated. It was only when I be-

American Physicians in May, 1893. I was able then to demonstrate to the Association by means of living animals that in the rabbits having previously received the preventive injections of living bird bacilli, the virulent inoculation at first gave rise to a violent reaction of the tissues, which ended generally in cure, while the tuberculous process similarly induced in the controls was steadily progressive, though at first it was accompanied by little or no local reaction. I have



Interior of Laboratory.

gan to make use of living cultures as a protective inoculation that I met with any encouraging results, and my experience would indicate that the living germ is essential to what success has been attained in the production of artificial immunity against tuberculosis.

By preventive inoculations of living bird tubercle bacilli in rabbits, I got undoubted evidence of a marked degree of artificial immunity in experiments which I reported to the Association of

many times since confirmed these results by various experiments.

De Schweinitz, McFadyean, and Pearson and Gilliland, in this country, and Behring, Koch, Maragliano, and Neufeld, abroad, have since from time to time reported success in protecting animals, principally cattle, by preventive inoculations, and in producing a very marked degree of artificial immunity in these animals.

Behring's immunized calves not only failed to

become infected when placed in infected stables where the control animals all quickly developed tuberculosis, but they resisted intravenous inoculations of virulent bacilli to which control animals rapidly succumbed. These facts would make it appear that artificial immunity to tuberculosis is perhaps not as Utopian a dream as it has hitherto always been considered.

The excellent opportunities for original investigation which the Laboratory affords, have always been freely put at the disposal of any medical man desiring to make researches bearing on the etiology, bacteriology, or chemistry of tuberculosis, or to test experimentally proposed specific methods of treatment. The original work accomplished in this way in the Laboratory by my colleagues and myself has been published from time to time during the past twelve or fifteen years in various medical journals, and comprises some thirty-seven papers, sixteen by my colleagues, and twenty-one by myself, but time will not permit me to review this work at present.

The Saranac Laboratory was the first laboratory in this country devoted to original researches in tuberculosis. It has no endowment, has been and still is dependent each year on my own efforts to obtain the funds necessary for the continuance of its work. The same self-sacrificing devotion which has been so helpful a feature of the work of my associates at the Sanitarium for the past twenty years has always been given without stint by my colleagues in the Laboratory, and in the face of many discouragements and difficulties has alone made possible the continuance of what researches have been carried on there.

It was not only, however, at the Sanitarium and the Laboratory that the tuberculosis problem had to be met, but the village of Saranac Lake has been constantly called upon to adapt itself to new conditions, which have transformed it from a guides' settlement to a busy town and much frequented health resort. For twenty years an ever increasing number of invalids has been steadily settling down in Saranac Lake, and the town has now practically developed into a cottage sanitarium on a large scale in order to meet the requirements of an ever-growing invalid population, belonging to all classes of society, from the affluent to the penniless consumptive. For the rich, it now affords beautiful and even luxurious homes, which have been designed and built with a special view to the hygienic care and requirements of the invalid, and for carrying out with the greatest convenience and comfort the open-air method of treatment in the rigorous climate of these mountains. These features are to be found more or less perfectly developed even in the more humble boarding places which abound in the town.

An efficient Board of Health has instituted modern methods of guarding against infection. Rules and regulations to that effect are exposed in public places, and enforced as far as practicable in the town, and disinfection and fumigation of

rooms recently occupied by the sick is made compulsory. There is still much to be done in this direction, but much has been accomplished already.

The residents of Saranac Lake have not been unmindful of the poor consumptive whose name is legion. The district nurse, whose expenses are defrayed by the benevolent, is constantly occupied in instructing and nursing those who are too sick to properly care for themselves, and when death comes, as it often does to the lonely consumptive far away from home and without friends, the same charitable spirit which has tried to relieve his lot provides him with a decent burial. How little those who so often speak disparagingly of Saranac Lake because it harbors so many invalids, know of the burden of human misery, not its own, which this small and remote town has ministered to as best it could for so many years. The Sanitarium has also done its share in trying to help those to whom it cannot open its doors.

A Bureau of Information is supported by the institution in the town, and assists rejected candidates to find cheap boarding places, and a free dispensary is maintained at the town office of the Sanitarium where medical advice is given free of charge daily by my associates to those who apply. This branch of its work is growing so rapidly as to be a severe tax already on the time and strength of these physicians.

Before leaving the subject I must call your attention to one more merciful work which has been done at Saranac Lake for the consumptive; namely, the Reception Cottage. This cottage has been established by Miss Mary R. Prescott, and is maintained by her generosity. It is in charge of a devoted trained nurse, and here a few acutely ill or advanced cases, who cannot be taken at the Sanitarium, are often refused at the boarding houses, and who are in need of constant nursing which they cannot afford to procure, are taken and cared for at a very moderate cost.

Saranac Lake has had, perhaps, no more illustrious visitor, or at least, none in whom the public took a deeper interest, than Robert Louis Stevenson, and Mr. Baker's Cottage in the outskirts of the village, where he spent the fall and winter of 1889, has become an object of historical interest. In its little sitting-room Stevenson received the visits of many prominent men who journeyed to Saranac Lake to see him, and it was in this room, on a cold winter night, by the light of the wood fire in the big fireplace, while Stevenson sat on a chair placed on top of the table which had been moved into a corner, that Richard Mansfield delighted the great author with his weird and gruesome impersonation of "Dr. Jekyll" and "Mr. Hyde."

To a temperament like Stevenson's, who shrank from the grim, inexorable facts of life, and lived in an ideal world, painted and peopled by his own vivid imagination, who craved sunshine, blue skies, and tropical seas and verdure, Saranac Lake in winter, with its ice and snow, its gray skies, and its ever-present and ubiquitous prob-

lem of human suffering and sorrow, did not especially appeal, but he acknowledged to me, and in his writings also, that his health was much benefited by his stay there.

He naturally looked with repugnance on the exact and uncompromising methods of scientific research and animal experimentation, and we had many heated arguments on this subject. I finally persuaded him one day to visit the little room in my cottage which was then my only laboratory. He had just written for *Scribner's* a short essay entitled, "The Lantern Bearers," in which some of his beautiful thoughts had as a text a game he and the other boys played, and which consisted simply of walking along the beach on a dark night, hiding under their coats a lantern, which was only flashed at each other as they passed as a signal. I was intent on showing him my animals and culture tubes, and the ravages which are caused by the tubercle bacillus in the organs of animals, and was trying to impress upon him the possibilities which lay in these experiments in advancing our knowledge of a germ which kills one in seven of the human race, when suddenly I noticed that he looked pale, was not listening, and was edging toward the door as fast as possible. As soon as he got outside he turned to me and said, "Trudeau, your lantern may be very bright to you, but to me it smells of oil like the mischief." It was evident that neither of us could fully appreciate the brightness of each other's lantern, though we both tried.

In looking backward over the development of the tuberculosis problem we cannot but be struck with the marked change that has been wrought in the attitude of both the profession and the laity towards this disease. Twenty-five years ago it was one of hopeless indifference, to-day it is one of hopeful expectancy and interest. This has been brought about principally by the work of two men, Brehmer and Koch. Brehmer taught us the value of sanitarium methods, and the great principles which underlie the open-air treatment of tuberculosis. At that time the consumption hospitals and the wards for consumptives in general hospitals were so depressing a spectacle, and their death rate so appalling, that they were frequently given up, and their establishment discouraged by the profession as useless and only likely to shorten the consumptive's life. To-day we know that we can save one-third of all cases received for treatment at a modern sanitarium, and I have shown you evidence that the cures thus wrought are much more than temporary.

Over the doors of the wards and hospitals for consumptives, twenty-five years ago, might well have been written these words: "All hope abandon ye that enter here," while to-day, in the light of the new knowledge, we may justly place at the entrance of the modern sanitarium the more hopeful inscription, "Cure sometimes, relieve often, comfort always."

Before Koch's great discovery of the tubercle bacillus, we were ignorant as to the cause of tuberculosis and the method of its propagation, and helpless to do anything to stay its spread. Hence-

forth, tuberculosis is no longer a mysterious and intangible entity which slays its myriads of victims by unknown means, but we possess in the tubercle bacillus the specific agent which produces the disease. We can detect its presence in the various secretions of suspected cases, and thus discover the true nature of the malady and guard against the spread of the disease by simple and practical means. We can grow the germs in our laboratories, study the poison and watch the mechanism of its action in the bodies of living animals, and beyond all, lies the hope that further knowledge gained along these lines in the laboratory as to the conditions which favor or retard its growth in the body, and which produce artificially increased resistance in the living organism, may some day lead to a specific method of treatment which will render both men and animals more resistant to its destructive influence.

The tuberculosis problem, as it has been developed at Saranac Lake, is instructive, because it has been carried on from the first practically along the three lines which must be followed in the future struggle with the disease by other communities, namely prevention, treatment, and study. In the town and at the Sanitarium by education of the invalid, by the Health Board's regulations, and the disinfection of infected surroundings, by the intelligent care of the very sick in the Sanitarium Infirmary, and in the boarding houses and at the Reception Cottage, prevention has found its practical application. Treatment has made for itself a brilliant field in the development of the Sanitarium methods and the application of these methods to patients in the town, while the study of tuberculosis in its scientific aspect has interruptedly gone on at the Laboratory, and to this latter department of the work must we look with hope for increased knowledge to aid us in our struggle with the disease.

I have tried, however, imperfectly, to describe to you, how, in the midst of these remote surroundings, the tuberculosis problem has been practically met. While engaged in this work and in meeting our own local problems, my associates and I have witnessed the general spread of the new knowledge and its application by others to the needs of great communities all over the land, the building of many private sanitariums, and the growing feeling of hopefulness which of late years has enlisted the co-operation of the State, the philanthropist, the medical profession, and the laity.

To the labors of Flick in Philadelphia and Biggs in New York City are due the framing, adoption, and development of the more practical measures of prevention which already have lowered appreciably the death rate from tuberculosis in New York City, and promise in the future, as they are further developed and more generally adopted, even more brilliant results. Meanwhile experimental research and laboratory methods have steadily added to our scientific knowledge of the disease, and constantly taught us new facts which have been at once applied practically to its prevention and early detection, while the re-

searches of Koch, Behring, Maragliano, and Neufeld, abroad, and of De Schweinitz, McFadyean, Pearson and Gilliland, and myself in this country, have already brought forward evidence that a marked degree of artificial immunity against tuberculosis can be produced in animals, and the success already obtained in this direction seems sufficient to justify the hope that prevention may some day find a most efficient ally in the discovery of some safe method of immunization applicable to man.

Within the year comes the announcement that

a large-hearted man has donated to science and philanthropy a princely sum from the fortune he has acquired in a successful life of business activity, and aided by men of science, has founded the Henry Phipps Institute for the Prevention, Treatment, and Study of Tuberculosis, under whose auspices we are gathered here to-night. No one, I am sure, can wish this great work Godspeed more earnestly than I do, or appreciate more thoroughly the glorious future that opens before it in the advancement of knowledge and the relief of human suffering.



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